Small Business Innovation Research/Small Business Tech Transfer

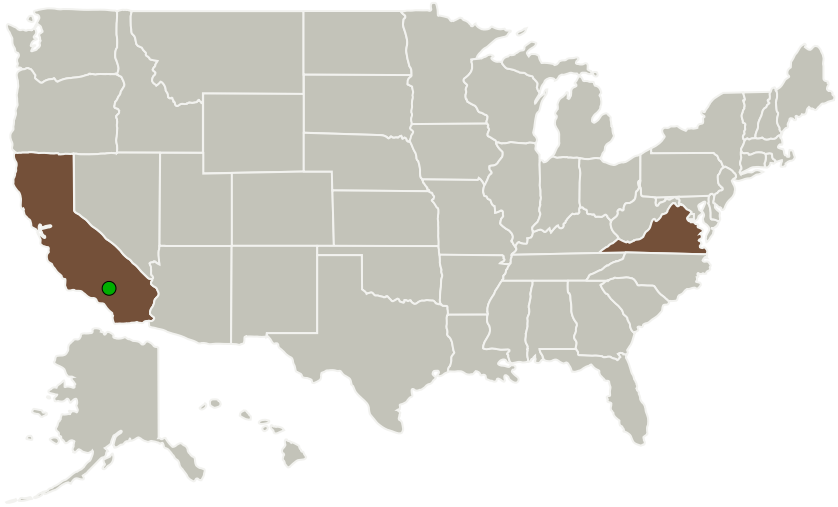
High Sensitivity Semiconductor Sensor Skins for Multi-Axis Surface Pressure Characterization, Phase I

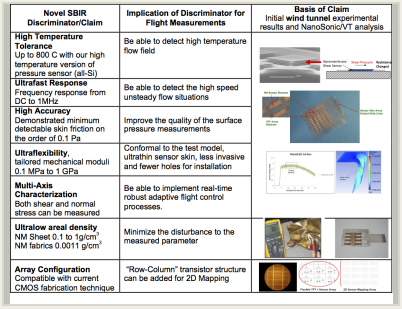
Completed Technology Project (2015 - 2015)

Project Introduction

This NASA Phase I SBIR program would fabricate high sensitivity semiconductor nanomembrane 'sensor skins' capable of multi-axis surface pressure characterization on flight test vehicles, wind tunnel models as well as operational aerospace vehicles, using SOI (Silicon on Insulator) NM techniques in combination with our pioneering HybridSil® ceramic nanocomposite materials. Such low-modulus, conformal nanomembrane sensor skins with integrated interconnect elements and electronic devices can be applied to new or existing wind tunnel models for multi-axis surface pressure analysis, or to lightweight UAVs as part of active flutter control systems. NanoSonic has demonstrated the feasibility of NM transducer materials in such sensor skins for the measurement of dynamic shear stress and normal pressure. Semiconductor NM sensor skins are thin, mechanically and chemically robust materials that may be patterned in two dimensions to create multi-sensor element arrays that can be embedded into small probe tips or conformally attached onto vehicle and model surfaces. Sensors may be connected to external support instrumentation either through thin film and ribbon cable interconnects, or potentially wirelessly using RF communication directly from electronic networks incorporated into the sensor skin material.

Primary U.S. Work Locations and Key Partners





High Sensitivity Semiconductor Sensor Skins for Multi-Axis Surface Pressure Characterization, Phase I

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	3
Technology Areas	3
Target Destinations	3

Small Business Innovation Research/Small Business Tech Transfer

High Sensitivity Semiconductor Sensor Skins for Multi-Axis Surface Pressure Characterization, Phase I

Completed Technology Project (2015 - 2015)

Organizations Performing Work	Role	Type	Location
Nanosonic, Inc.	Lead Organization	Industry	Pembroke, Virginia
Armstrong Flight Research Center(AFRC)	Supporting Organization	NASA Center	Edwards, California

Primary U.S. Work Locations	
California	Virginia

Project Transitions

June 2015: Project Start

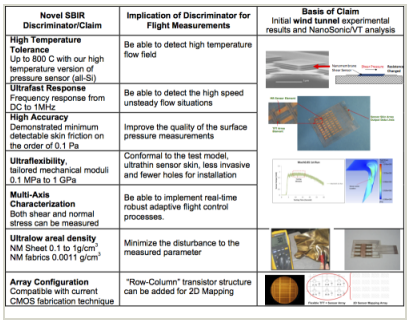
December 2015: Closed out

Closeout Summary: High Sensitivity Semiconductor Sensor Skins for Multi-Axis Surface Pressure Characterization, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/138938)*

Images



Briefing Chart Image
High Sensitivity Semiconductor Sensor Skins for Multi-Axis Surface Pressure Characterization, Phase I *(https://techport.nasa.gov/image/136072)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Nanosonic, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Hang Ruan

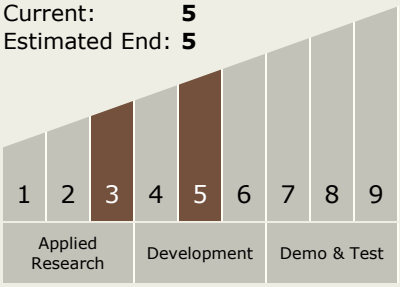
Co-Investigator:
Hang Ruan

High Sensitivity Semiconductor Sensor Skins for Multi-Axis Surface Pressure Characterization, Phase I

Completed Technology Project (2015 - 2015)

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.3 In-Situ Instruments and Sensors
    - TX08.3.4 Environment Sensors

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System